DINOSAURS!

•DISCOVER THE GIANTS O E PREHISTORIC WORLD•

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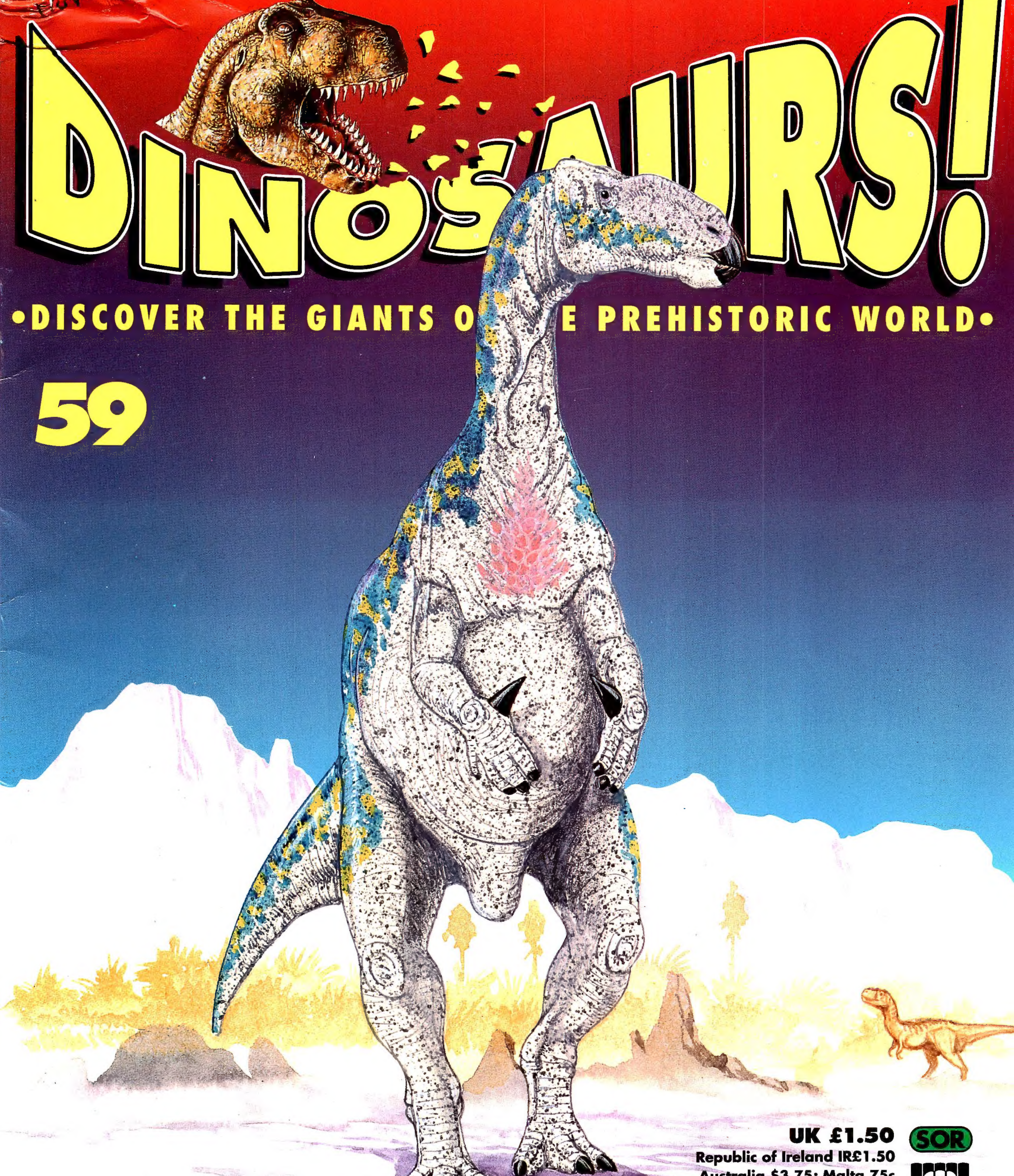

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DINOSAURS!

• DISCOVER THE GIANTS OF THE PREHISTORIC WORLD •

IDENTIKIT

From one of the rarest to one of the oldest dinosaurs
MUTTABURRASAURUS 1393
LYSTROSAURUS 1396
SALTOPUS 1397

PREHISTORIC WORLD

GRASSLANDS AND GRAZERS 1398

SPOTTER'S GUIDE

STOP PRESS 2... more late news from the Mesozoic! 1406

TIME DETECTIVE

Find out about the groups of animals that died out completely in MASS EXTINCTIONS 1408

HISTORY IN PICTURES

A DAY IN THE LIFE OF SMILODON 1412

A to Z

Prehistoric animals with names beginning with the letter D 1416

ASK THE EXPERT

Dr David Norman of Cambridge University answers more of your dinosaur queries BACK COVER

PLUS

GIANTS OF THE PAST

A group of *Muttaburrasaurus* in Mid-Cretaceous Australia 1402

3-D Gallery

Huge *Deinosuchus* attacks a helpless *Hypacrosaurus* 1404

FACT FILE

Test your knowledge and catch up on your facts 1414

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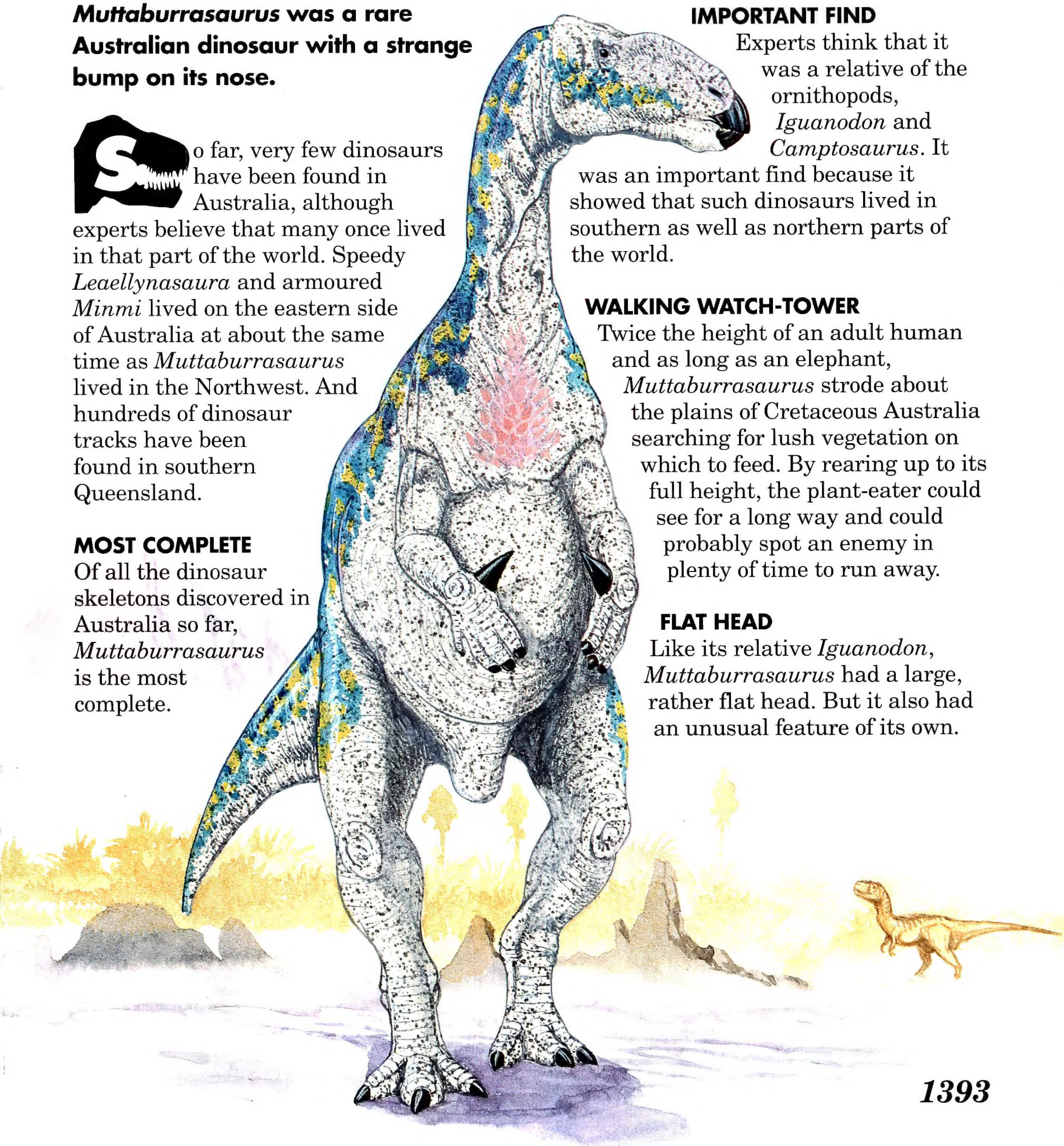
MUTTABURRASAURUS

***Muttaburrasaurus* was a rare Australian dinosaur with a strange bump on its nose.**



So far, very few dinosaurs have been found in Australia, although experts believe that many once lived in that part of the world. Speedy *Leaellynasaura* and armoured *Minmi* lived on the eastern side of Australia at about the same time as *Muttaburrasaurus* lived in the Northwest. And hundreds of dinosaur tracks have been found in southern Queensland.

MOST COMPLETE

Of all the dinosaur skeletons discovered in Australia so far, *Muttaburrasaurus* is the most complete.

IMPORTANT FIND

Experts think that it was a relative of the ornithopods, *Iguanodon* and *Camptosaurus*. It was an important find because it showed that such dinosaurs lived in southern as well as northern parts of the world.

WALKING WATCH-TOWER

Twice the height of an adult human and as long as an elephant, *Muttaburrasaurus* strode about the plains of Cretaceous Australia searching for lush vegetation on which to feed. By rearing up to its full height, the plant-eater could see for a long way and could probably spot an enemy in plenty of time to run away.

FLAT HEAD

Like its relative *Iguanodon*, *Muttaburrasaurus* had a large, rather flat head. But it also had an unusual feature of its own.

MONSTER FACTS

- **NAME:** *Muttaburrasaurus* (mut-a-bur-a-saw-rus) means 'Muttaburra reptile' after the place in Australia, where it was found
- **GROUP:** dinosaur
- **SIZE:** up to 7m long
- **FOOD:** plants
- **LIVED:** about 105 million years ago in the Mid-Cretaceous Period at Muttaburra, Queensland, Australia

CUT AND SLICED

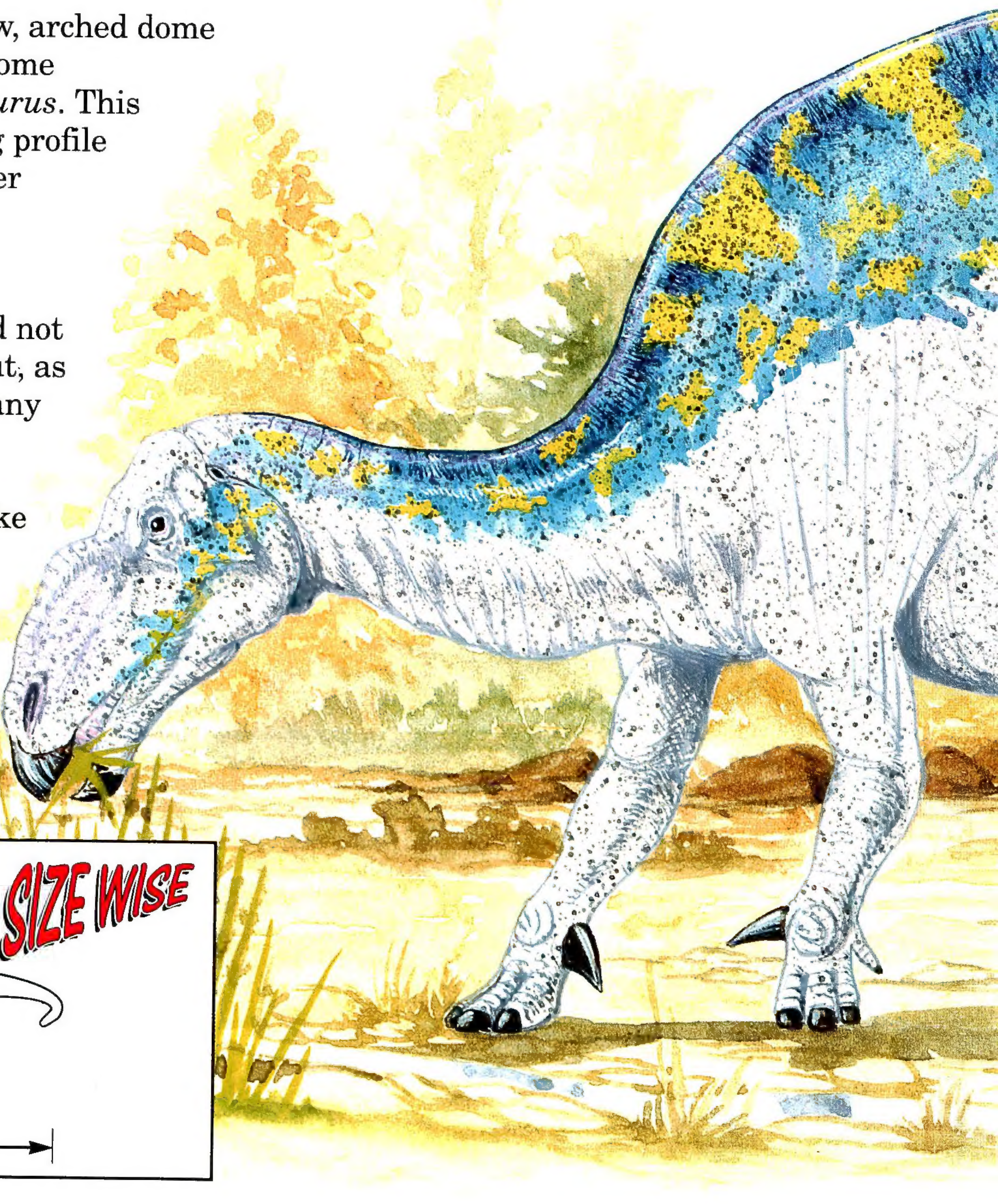
Muttaburrasaurus had a toothless beak for nipping off shoots. It had teeth at the sides of its mouth, which were better suited to cutting and slicing plants than were *Iguanodon*'s grinding teeth. It is possible that *Muttaburrasaurus* had to cope with different types of vegetation than its more northerly relations. Some experts have even suggested that *Muttaburrasaurus* ate meat.

STRIKING PROFILE

Above its snout was a hollow, arched dome rather like those found on some hadrosaurs such as *Kritosaurus*. This gave the dinosaur a striking profile which may have helped other dinosaurs to recognise it.

THUMBS UP

Muttaburrasaurus' fossil did not include a complete hand. But, as it is like *Iguanodon* in so many ways, experts think it also shared another feature. *Iguanodon* had a thumb spike on each hand for raking down branches or for defence. It is very likely that *Muttaburrasaurus* also had spiky thumbs which it used to slash or stab at predators.



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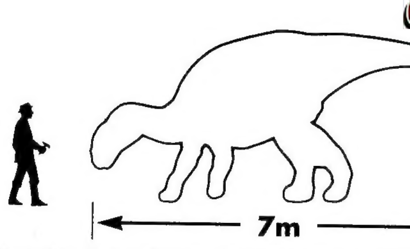
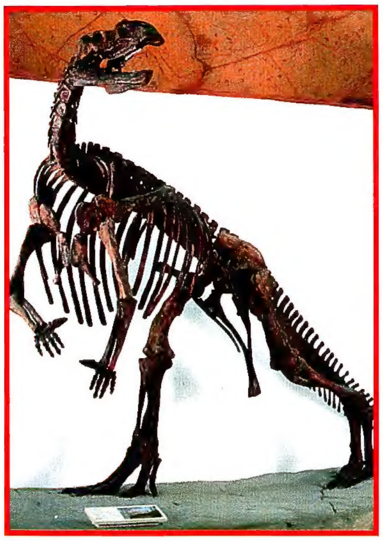
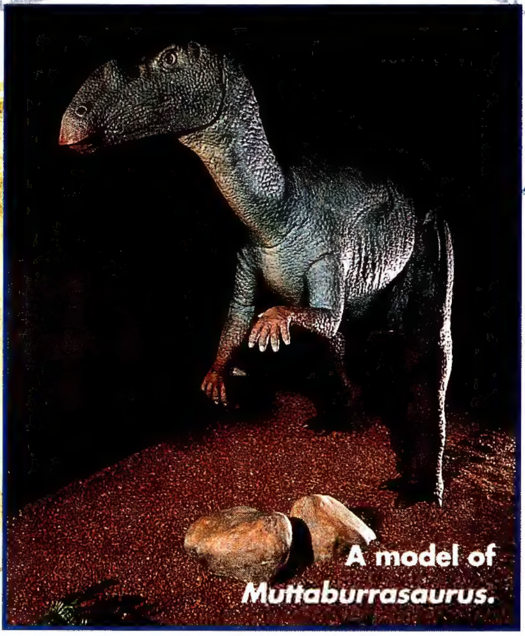


UP AND DOWN

Muttaburrasaurus usually walked on two powerful legs with its long, tapering tail held out above the ground. But when it came across a particularly tempting cluster of ferns or horsetails, *Muttaburrasaurus* probably flopped forwards on to all fours and bent its head low to browse among the ground-covering plants.



The skeleton of *Muttaburrasaurus*, the most complete dinosaur found in Australia, is on show at the Queensland Museum in Brisbane.



A model of *Muttaburrasaurus*.

Is it true that dinosaurs also lived in New Zealand?

Yes. One dinosaur has been found in New Zealand and there are probably many others still to be found. A vertebra of a theropod was found on New Zealand's North Island by Ralph Molnar in 1980.

LYSTROSAURUS

Like the hippopotamus of today, *Lystrosaurus* may have wallowed in muddy water.

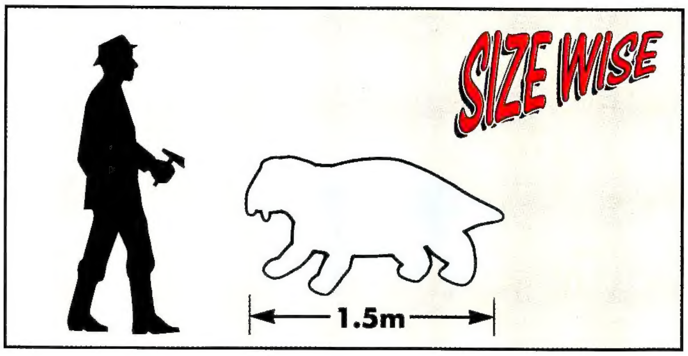
Lystrosaurus was a member of a family of mammal-like reptiles called the dicynodonts. These plant-eaters lived all over the world before the dinosaurs began their reign. These unusual reptiles had barrel-shaped bodies, short tails and short, sturdy legs.

SOME LIKE IT WET

Dicynodont means 'two dog-like teeth' and *Lystrosaurus* had a pair of fangs which hung from its upper jaw like Dracula's. They could be seen even when its jaws were closed. The rest of its jaw was toothless. *Lystrosaurus* probably lived on land and waded along the edge of rivers and lakes, and tugged at tough vegetation with the help of its hard beak. It may have used its tusks for digging up roots to eat.

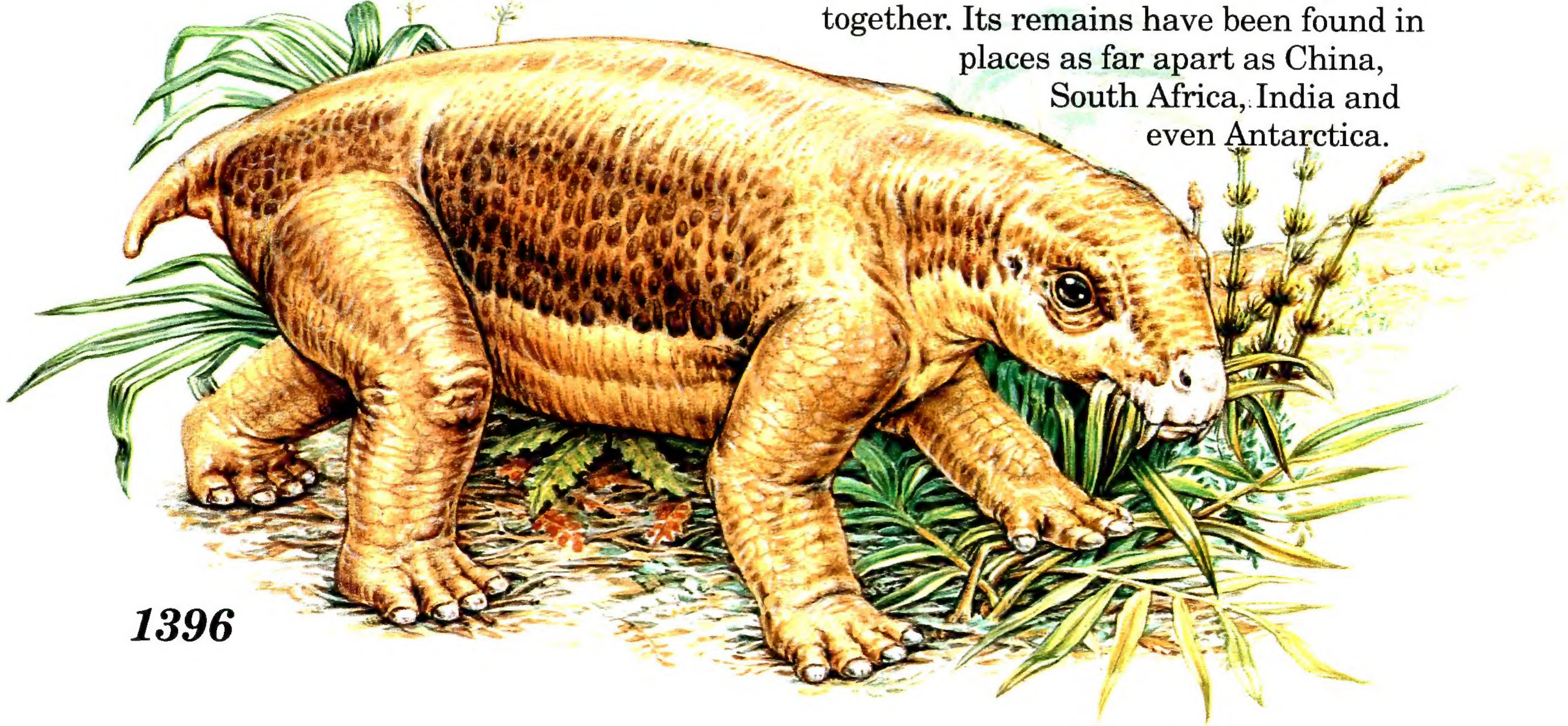
MONSTER FACTS

- **NAME:** *Lystrosaurus* (ly-stro-saw-rus) means 'shovel reptile'
- **GROUP:** mammal-like reptile
- **SIZE:** up to 1.5m long
- **FOOD:** plants
- **LIVED:** about 240 million years ago in the Early Triassic Period in Antarctica, South Africa, India and China



WELL-TRAVELLED

Lystrosaurus has given scientists yet more proof that land masses were once joined together. Its remains have been found in places as far apart as China, South Africa, India and even Antarctica.



SALTOPUS

One of the oldest of all dinosaurs, *Saltopus* was only about the size of a cat.

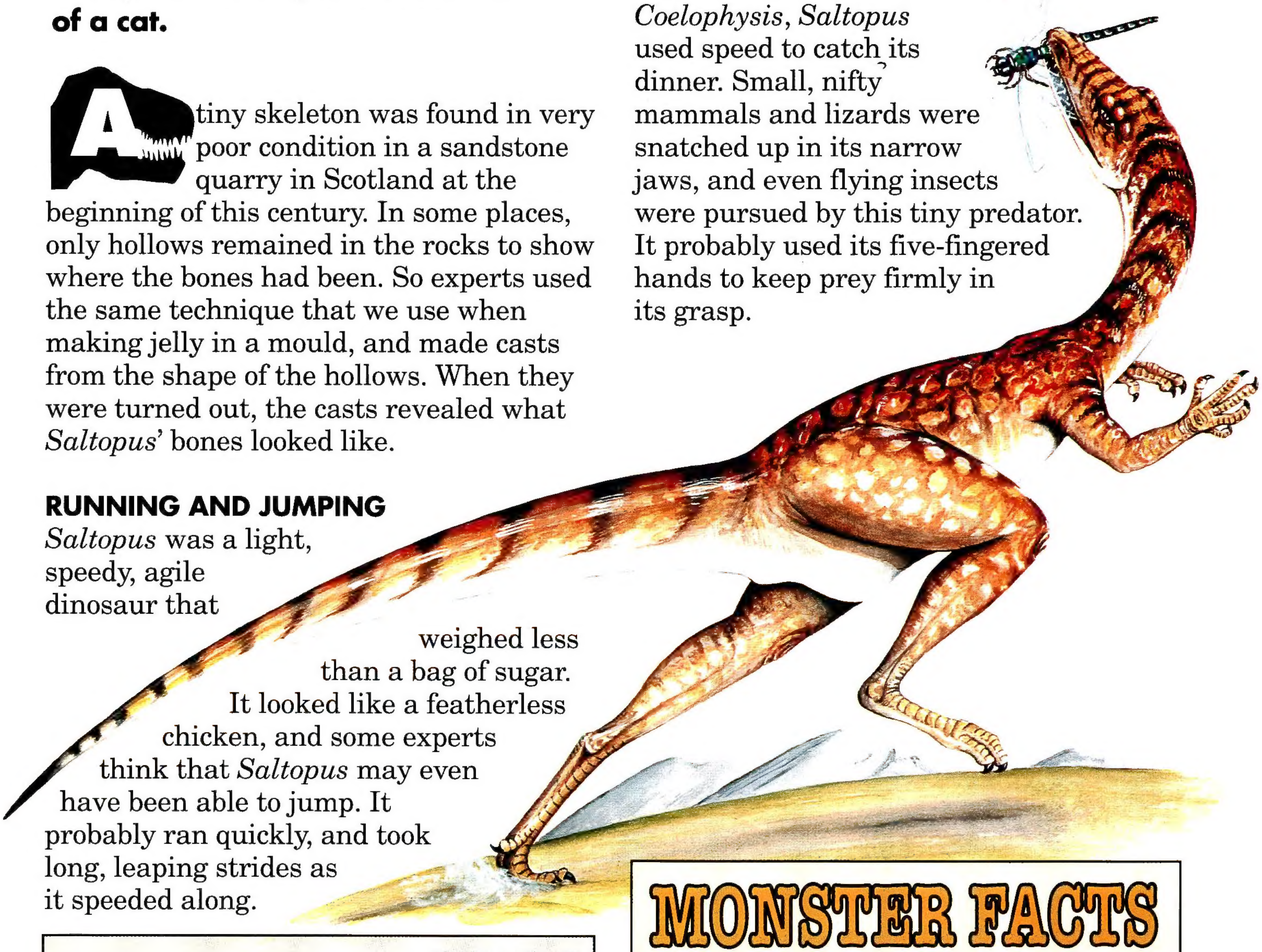
A tiny skeleton was found in very poor condition in a sandstone quarry in Scotland at the beginning of this century. In some places, only hollows remained in the rocks to show where the bones had been. So experts used the same technique that we use when making jelly in a mould, and made casts from the shape of the hollows. When they were turned out, the casts revealed what *Saltopus*' bones looked like.

RUNNING AND JUMPING

Saltopus was a light, speedy, agile dinosaur that weighed less than a bag of sugar. It looked like a featherless chicken, and some experts think that *Saltopus* may even have been able to jump. It probably ran quickly, and took long, leaping strides as it speeded along.

SMALL SNACKS

Like its relative, *Coelophysis*, *Saltopus* used speed to catch its dinner. Small, nifty mammals and lizards were snatched up in its narrow jaws, and even flying insects were pursued by this tiny predator. It probably used its five-fingered hands to keep prey firmly in its grasp.



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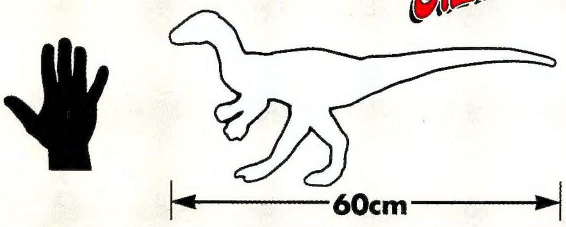


MONSTER FACTS

- **NAME:** *Saltopus* (salt-oh-pus) means 'leaping foot'
- **GROUP:** dinosaur
- **SIZE:** 60cm long
- **FOOD:** small animals and insects
- **LIVED:** about 250 million years ago in the Late Triassic Period in Scotland

Grasslands and grazers

It is difficult to imagine a world without grass. Yet the world was completely without any kinds of grass until about 40 million years ago.

Grass is a familiar plant that covers lawns and meadows. It is one member of a group called the grasses. Grasses make your breakfast, because oats and corn are grasses called cereal crops. Your hamburger bun is baked with flour from wheat, another cereal grass. Even the burger meat comes from cattle which eat grass. Millions of people and animals depend on grasses for food.

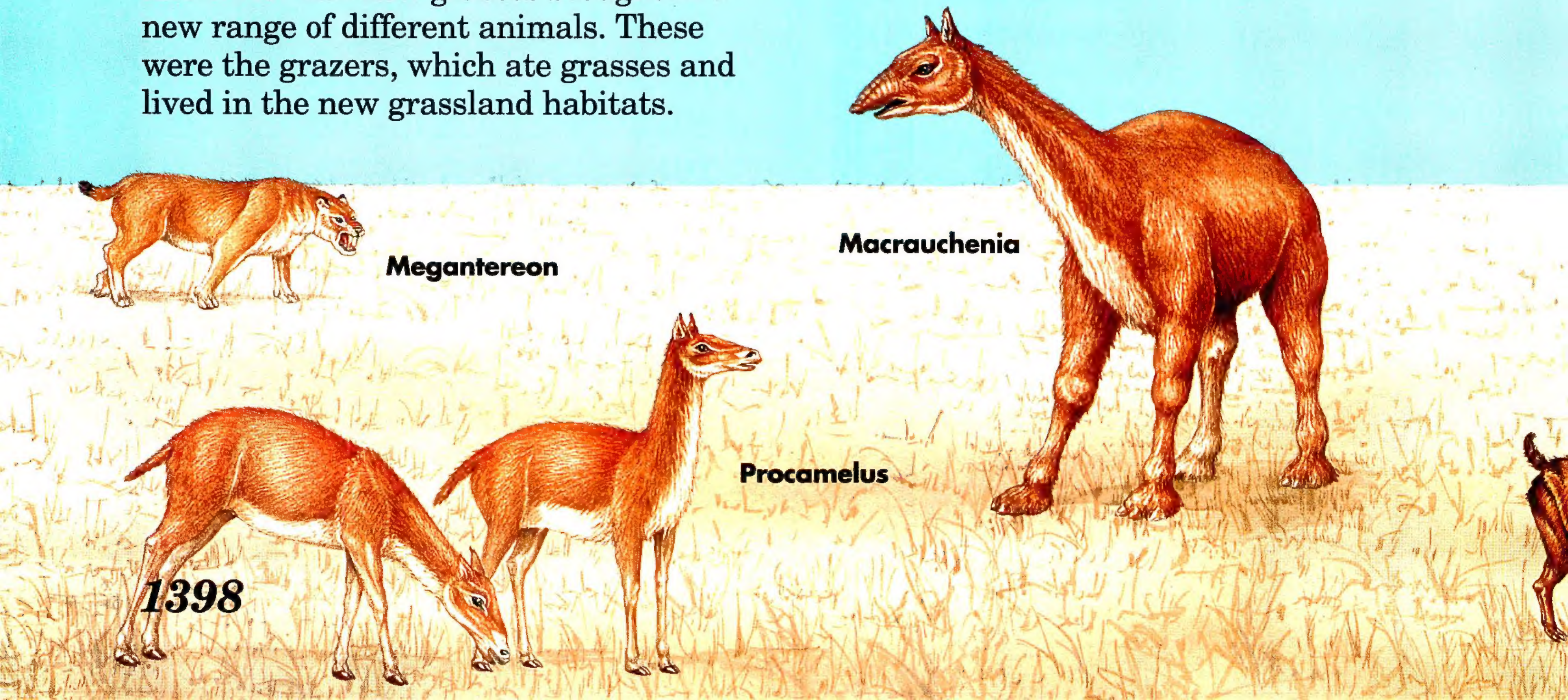
NEW FOOD FOR NEW ANIMALS

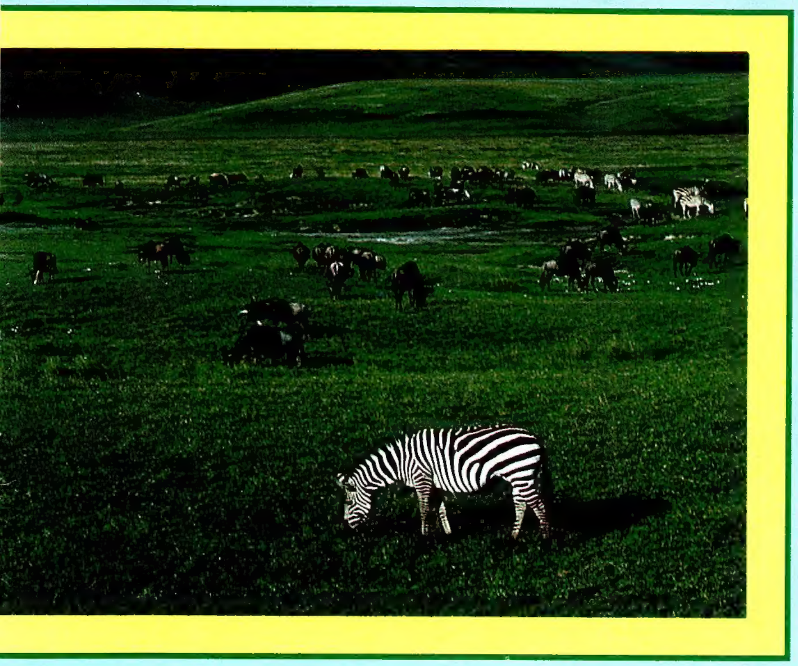
Grasses were a new food source, and had a huge impact on animal evolution. Before grasses, many animals were browsers, which means they ate the leaves of bushes and trees. The new grasses brought in a new range of different animals. These were the grazers, which ate grasses and lived in the new grassland habitats.

Zebras and wildebeest are modern grassland grazers. They thrive on the abundant grass available in areas such as the Ngorongoro Crater in Tanzania pictured here. Just as the early grazers had to watch out for predators like *Megantereon*, so today's grazers keep a look-out for lions and other predators.

EARLY GRAZERS

Dinosaurs did not eat grass. Not because they didn't like it, but because there wasn't any in the Age of the Dinosaurs. Grasses probably appeared in the Eocene Epoch, about 40 million years ago. In South America, many fossils have been found that were possibly early grass-eaters. *Rhynchippus,* from early Oligocene times, was horse-shaped and 1m long. *Macrauchenia* from the Pleistocene was around 3m long. Llama-like *Theosodon*, from the early Miocene, was 2m long.





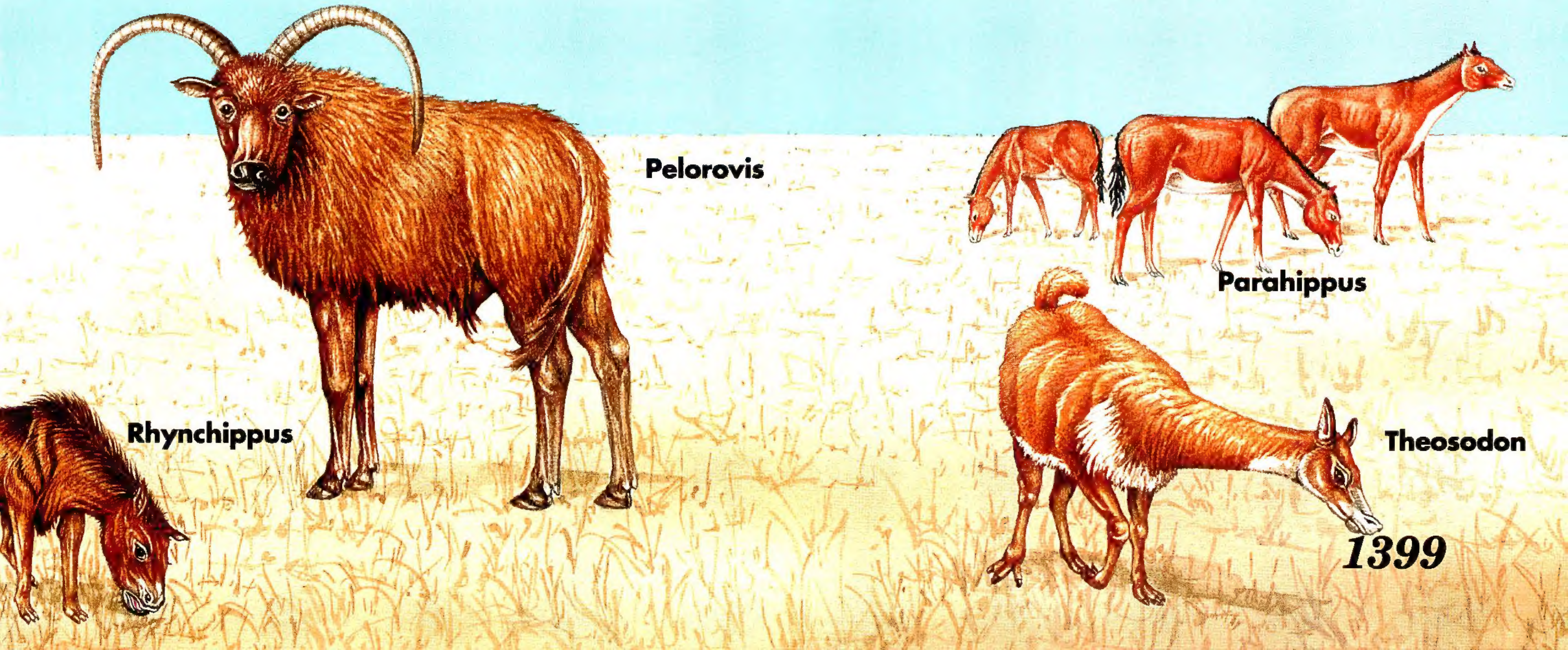
The feathery shoots that are standing upright on this Tufted Hair Grass are its flowers. The plant's short stems are not so easy to see as they are lying on the ground.

CAMELS AND CATTLE

Procamelus lived in North America in the late Miocene Epoch. It was a small member of the camel family, about 1.5m long. Unlike today's camels, it didn't have a prominent hump, but like them it did have strong grass-grinding cheek teeth. *Pelorovis* was a grazer from Africa that lived during the Pleistocene Epoch around two million years ago. It was about 3m long and was related to the buffaloes of today, with a large, muscular body and huge, down-curved horns.

What is GRASS?

Grass is a member of the Gramineae, or grasses, family. It is part of the large group called Angiosperms, or flowering plants. All grasses 'lie on their sides'. The green bits that stick up are the leaves. The stems are short and lie on the ground. They also have underground stems and bunches of thin roots. The flowers, called spikelets, grow on tall stems and are usually fluffy or feathery. Because grasses lie on their sides, they can survive repeated eating by grazing animals.



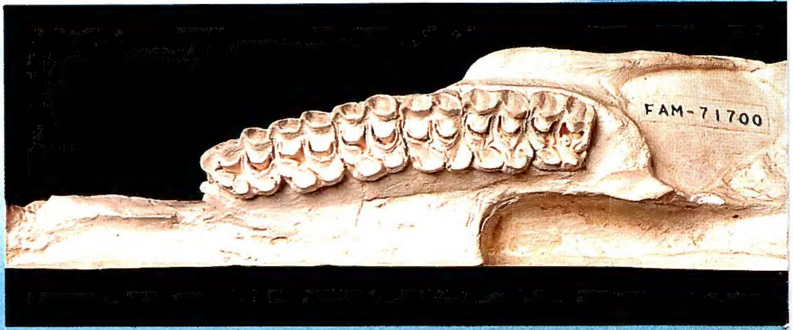
DROUGHT AND FIRE

During Miocene times, it seems that the trees which covered much of the land died away, and grasses took their place. Why? The main reason was the changing climate. Much of the world became cooler and drier. Trees cannot survive long, dry periods, but grasses can. Grasses have stems on the ground and roots underneath which stay alive during a drought. Grasses can even survive bush fires and will send up new green shoots from the roots.

GRAZED GRASS GROWS AGAIN

Another reason for the success of grass is its 'lying-on-its-side' design. If an animal nibbles a normal upright plant, it eats the growing tips of the main stem. So the plant may die. If an animal nibbles a grass, it eats only the ends of the leaves. The leaf bases and stems on the ground keep growing. So grass can be grazed many times, yet keep growing. This is why it is such a good food plant for animals.

Wheat is one of the most successful crops that is grown worldwide.



These fossilized teeth of *Parahippus* were worn down by eating grass.

THE ULTIMATE GRAZERS

In North America and Asia, the spread of grasslands produced very efficient grazing animals – horses, zebras and asses. One early horse shows how animals adapted to the new grasslands habitats. This is the 2m-long *Parahippus* from early Miocene times, which came out of the woodlands to eat grass instead of its usual diet of leaves.

CHANGING TEETH

How do we know these animals ate grass? As usual, fossil teeth give good clues. Grass leaves contain a hard chemical called silica, the same substance that forms sand. So eating grass wears teeth down. The new grazers evolved hard cheek teeth to resist wear, and high crowns to mash up the grass and get out the juicy goodness.

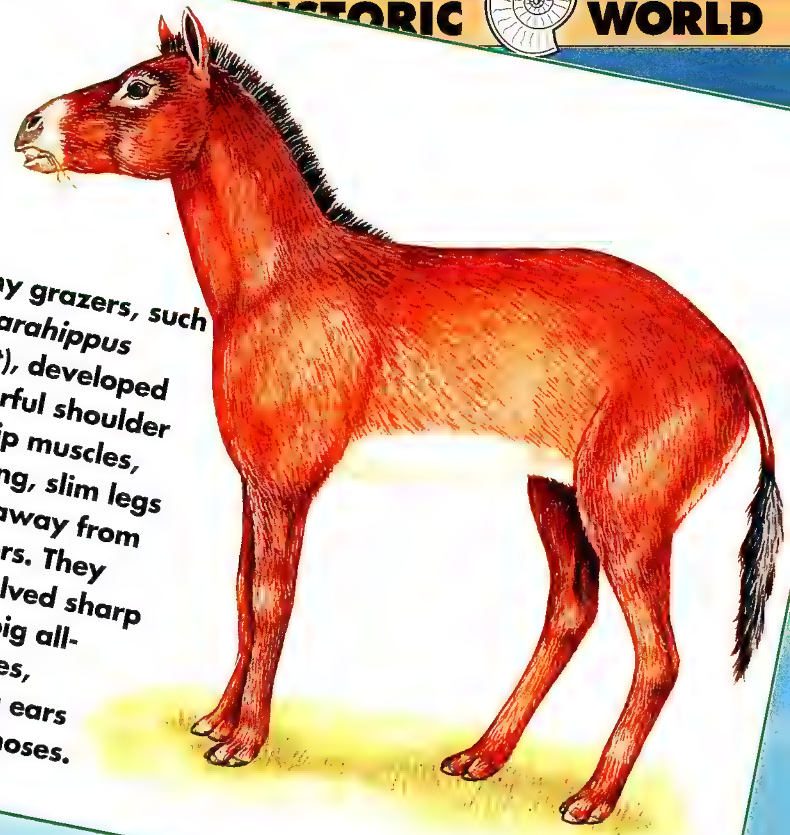
Grass and leaves are tough and difficult to digest. So plant-eaters such as antelopes, deer and cows partly chew their food and then swallow it into the rumen, for early digestion. They then bring up, or regurgitate, the semi-digested food to chew it once more. It is then swallowed again for further digestion in the other stomach chambers.

Highland cow

Is it true that grasses are the most successful plants?

Yes, especially since people started growing crops. Three-quarters of all farmland grows cereals and other grasses. There are between 7,500 and 10,000 kinds of grasses around the world, including:

- lawn and meadow grasses
- weeds such as couch grass and fescue
- all cereal crops, such as wheat, oats, barley, rye, rice, corn, maize and sorghum
- marram grass on sand dunes
- the millet you give to pet budgies
- fluffy white pampas grass
- tall, juicy sugarcane
- woody-stemmed bamboos



Many grazers, such as *Parahippus* (right), developed powerful shoulder and hip muscles, and long, slim legs to run away from predators. They also evolved sharp senses: big all-round eyes, swivelling ears and long noses.

HOOVES

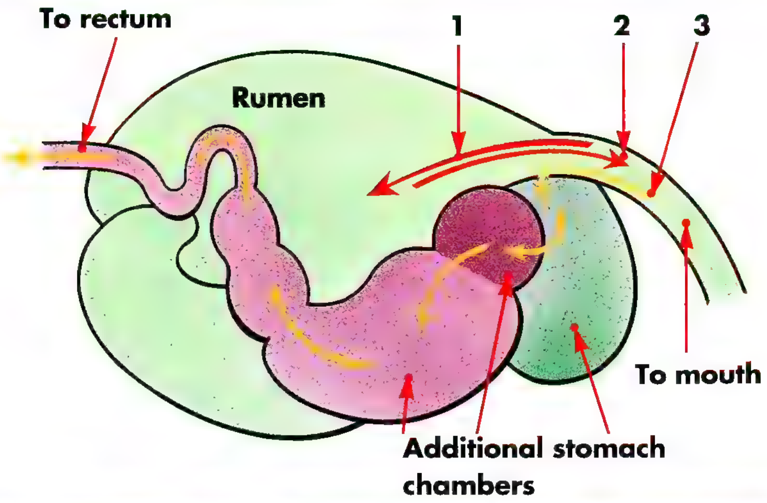
Running fast would damage claws or nails. So many grazers evolved light and strong hooves. Hoofed mammals, or ungulates, include cattle, pigs, giraffes, horses, rhinos and deer.

GRASSLANDS TODAY

PLACE	GRASSLAND NAME
East Africa	Savanna
Southern Africa	Veldt
North America	Prairie
South America	Pampas

GRASS – THE LIFE-GIVER

So you can see how much the evolution of grasses affected animal life. Remember this, next time you sit on it for a picnic!

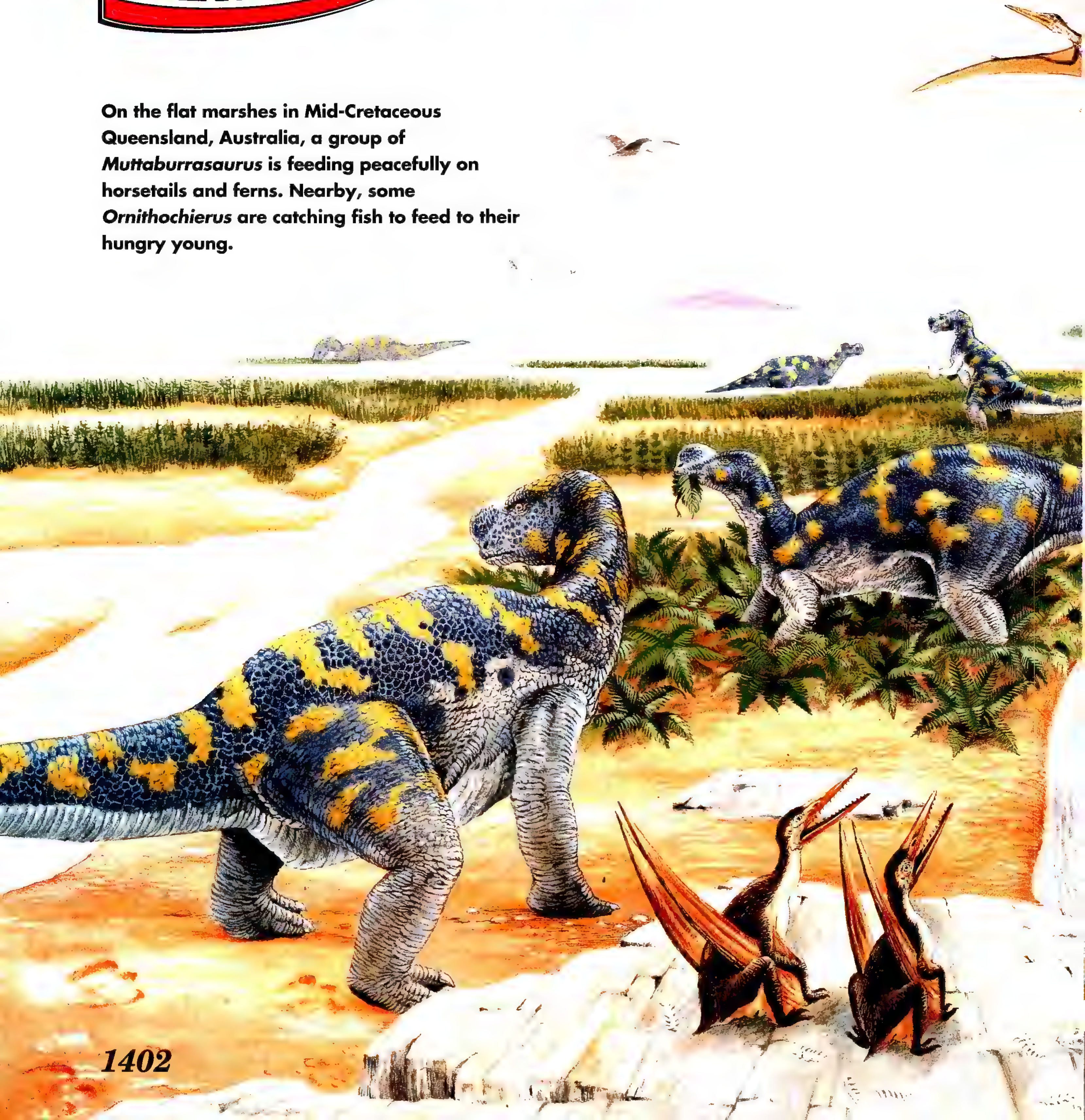


CHEWING THE CUD

When grazers eat grass, they eat it twice! The first time around, the grass is swallowed quickly and taken down to the first stomach, or rumen, where it is partially digested (1). All this food is then sent back (2) to the mouth in pellets, where it is chewed again. This is called 'chewing the cud' and is done when the animal is at rest in a safe place. Chewing the cud can take several hours. The chewed cud is swallowed once again (3) and sent into further stomach chambers for digestion.

GIANTS OF THE PAST

On the flat marshes in Mid-Cretaceous Queensland, Australia, a group of *Muttaburrasaurus* is feeding peacefully on horsetails and ferns. Nearby, some *Ornithochierus* are catching fish to feed to their hungry young.

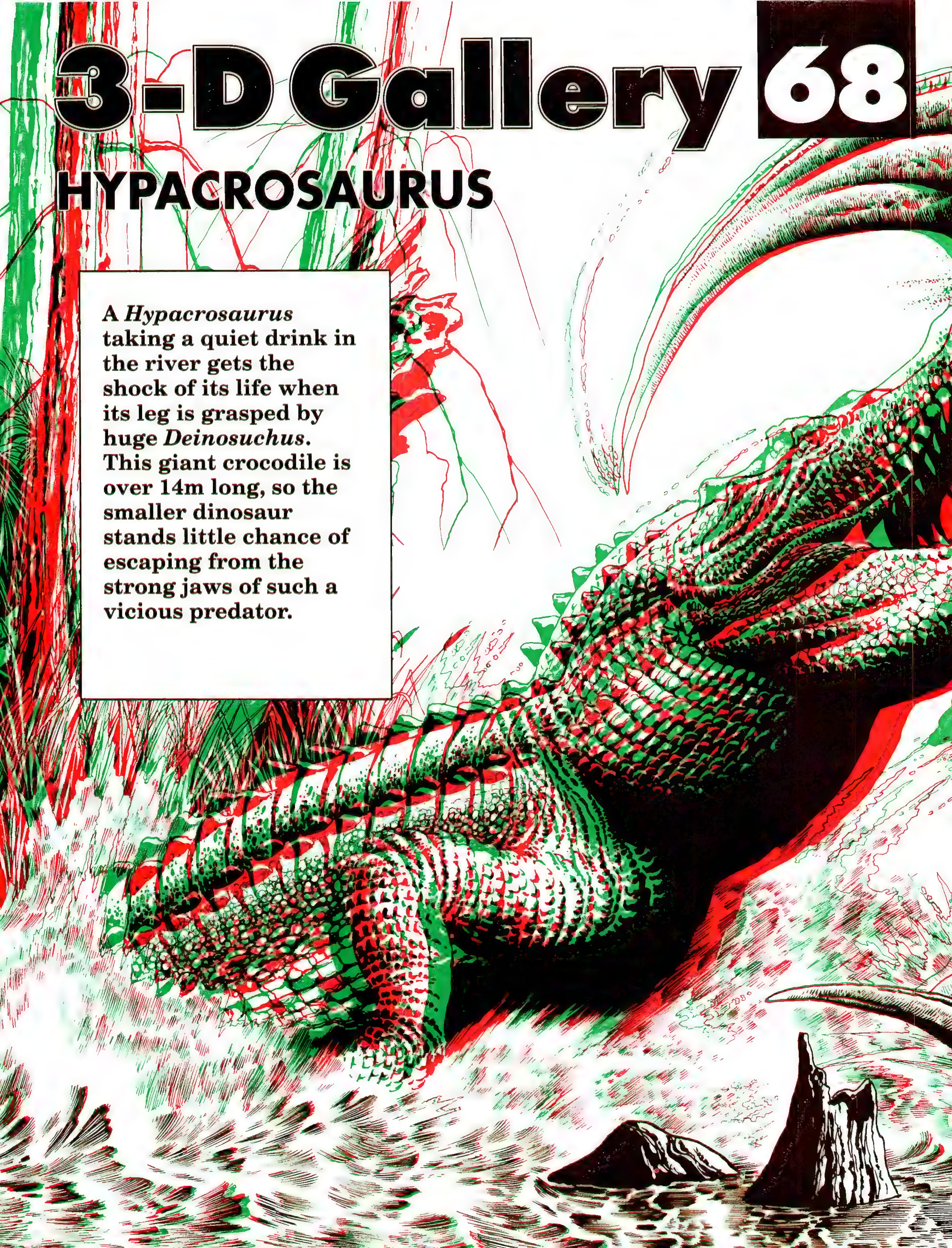


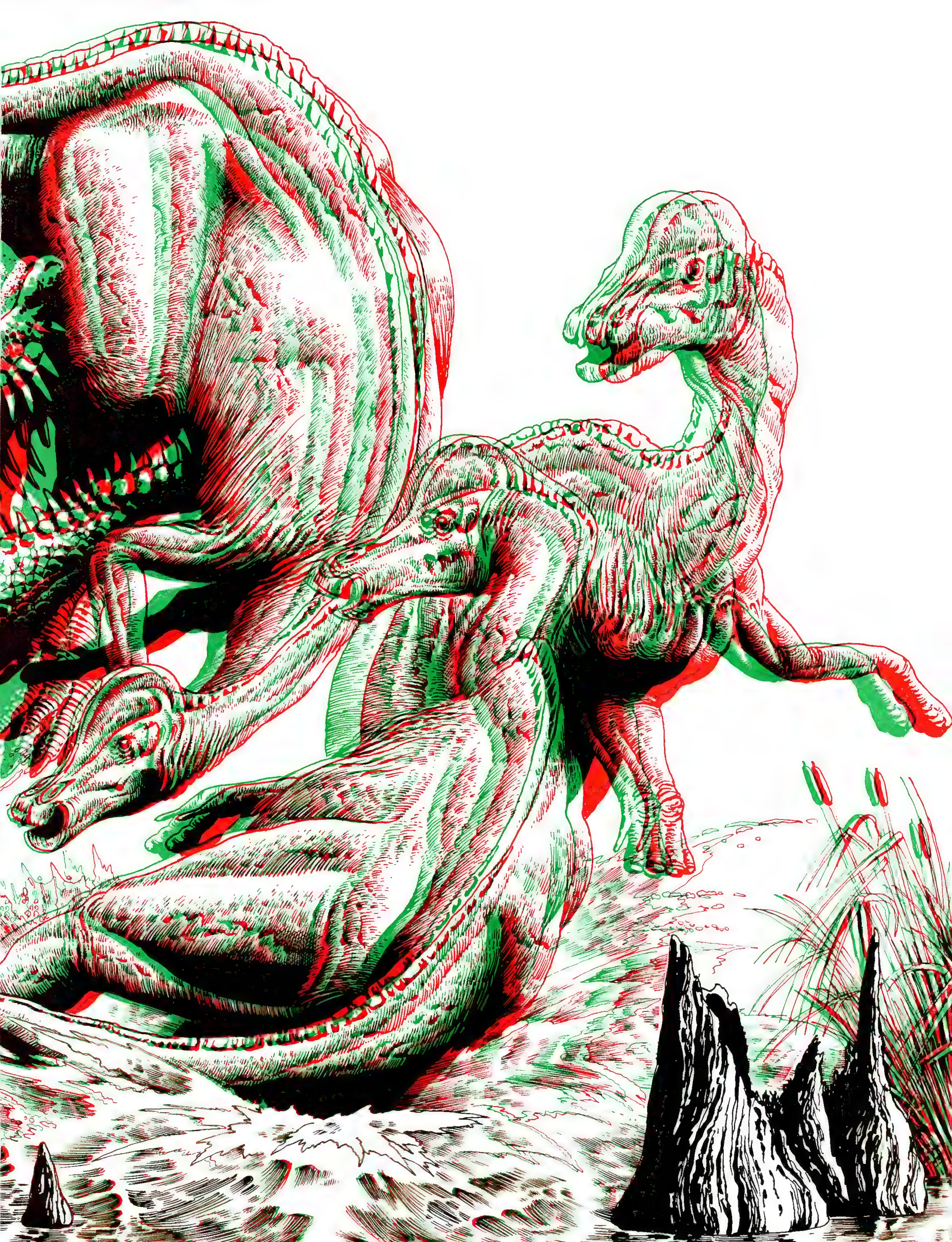
MUTTABURRASAURUS

3-D Gallery 68

HYPACROSAURUS

A *Hypacrosaurus* taking a quiet drink in the river gets the shock of its life when its leg is grasped by huge *Deinosuchus*. This giant crocodile is over 14m long, so the smaller dinosaur stands little chance of escaping from the strong jaws of such a vicious predator.





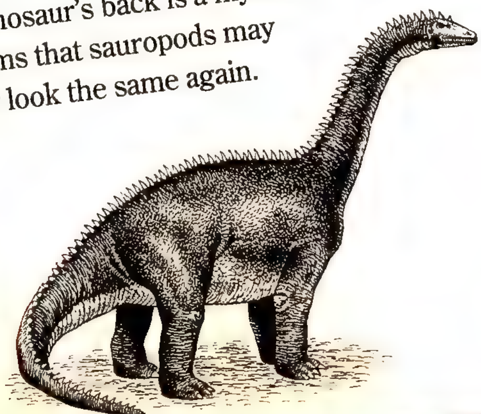
STOP PRESS 2...

MORE LATE NEWS FROM THE MESOZOIC!

Sauropods with spikes, new dinosaurs from Britain, and yet another 'big bang' are some of the latest dinosaur news. Experts take a long time to make their ideas public because they have to check out all the facts scientifically before they can publish them.

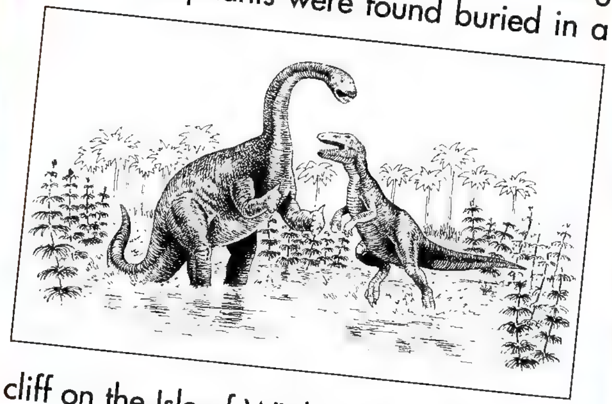
SAUROPODS GET A NEW IMAGE

A sculptor and palaeontologist from Utah has challenged the view that sauropods had smooth, streamlined body shapes. Stephen Czerkas examined the remains of a *Diplodocus*-like dinosaur found in Wyoming, North America, and concluded that at least part of its whiplash tail had spikes running along the centre. How far these spikes extended along the dinosaur's back is a mystery. But it seems that sauropods may never look the same again.



A COMPLETE CLIFFHANGER!

Geologist Steve Hutt has made history by unearthing the most complete dinosaur skeleton ever found in Britain. More than 100 bones from a brachiosaurid as long as two elephants were found buried in a cliff on the Isle of Wight in 1992. He also found two huge teeth of a predator, probably a megalosaur. Experts think that the dinosaurs had a battle and the big plant-eater lost.



FROZEN IN TIME

It is only in the last few years that dinosaur remains have been found in Antarctica. Hidden by the ice and snow, fossilized remains have been hard to find. Among the new discoveries are an ankylosaur (as yet unnamed), an ornithopod and a meat-eater with some strange horns.

Is this Jurassic Park?

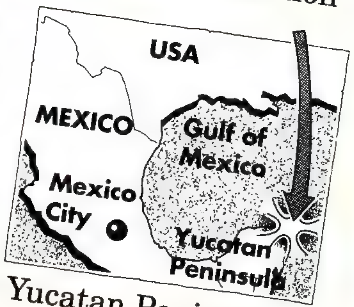
A huge tooth and some vertebrae, found deep in the Cotswold Hills in western England by Kevin Gardner and his young daughter, have unlocked the door to a wonderful discovery. The bones found belonged to two dinosaurs, *Megalosaurus* and *Cetiosaurus* from the Jurassic. Six years and several tonnes of clay later, more than 30,000 bones and teeth have been revealed. Experts believe up to four different dinosaurs lived in this small area as well as some mysterious bird-like creatures.

The dawn of the dinosaur age

In the foothills of the Andes Mountains, South America, an Argentinian student picked up an unusual rock. Inside lay two tiny teeth of what is probably the world's oldest known dinosaur. Recently named Eoraptor or 'dawn stealer', this flesh-eater lived 225 million years ago. A fierce predator, Eoraptor has been called the 'most primitive dinosaur ever found'.

The day the Earth went bang

Experts think they have a new clue as to why dinosaurs disappeared 66 million years ago. New evidence shows that a collision took place in the solar system. A huge crater, about 300km wide and 24km deep, found in the Yucatan Peninsula, Mexico, was probably caused by an asteroid which may have wiped out the dinosaurs.



Mass extinctions

Although the mass extinction that killed off the dinosaurs was spectacular, it was not the only one in the Earth's long history.

When all sorts of animals die at the same time we call it a mass extinction. What a terrible-sounding disaster!

ANIMALS – NO MORE…

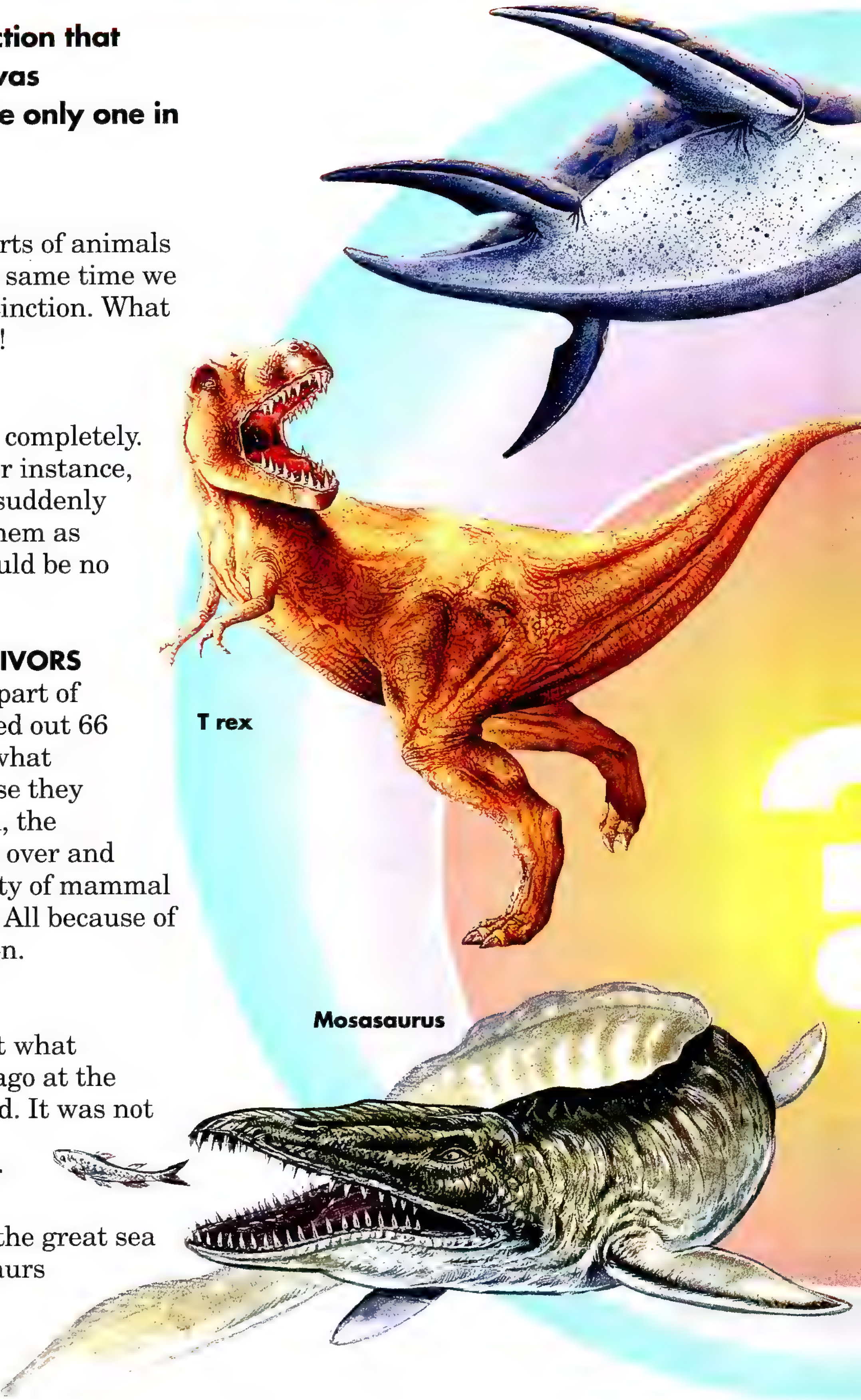
Extinction means dying out completely. Can you imagine that? If, for instance, all the whales in the world suddenly died, we would only know them as pictures in books. There would be no more whales, ever.

THE SUCCESS OF THE SURVIVORS

But species dying out is all part of evolution. The dinosaurs died out 66 million years ago and look what happened after that. Because they disappeared from the Earth, the mammals were able to take over and develop into the great variety of mammal life we see around us today. All because of the great dinosaur extinction.

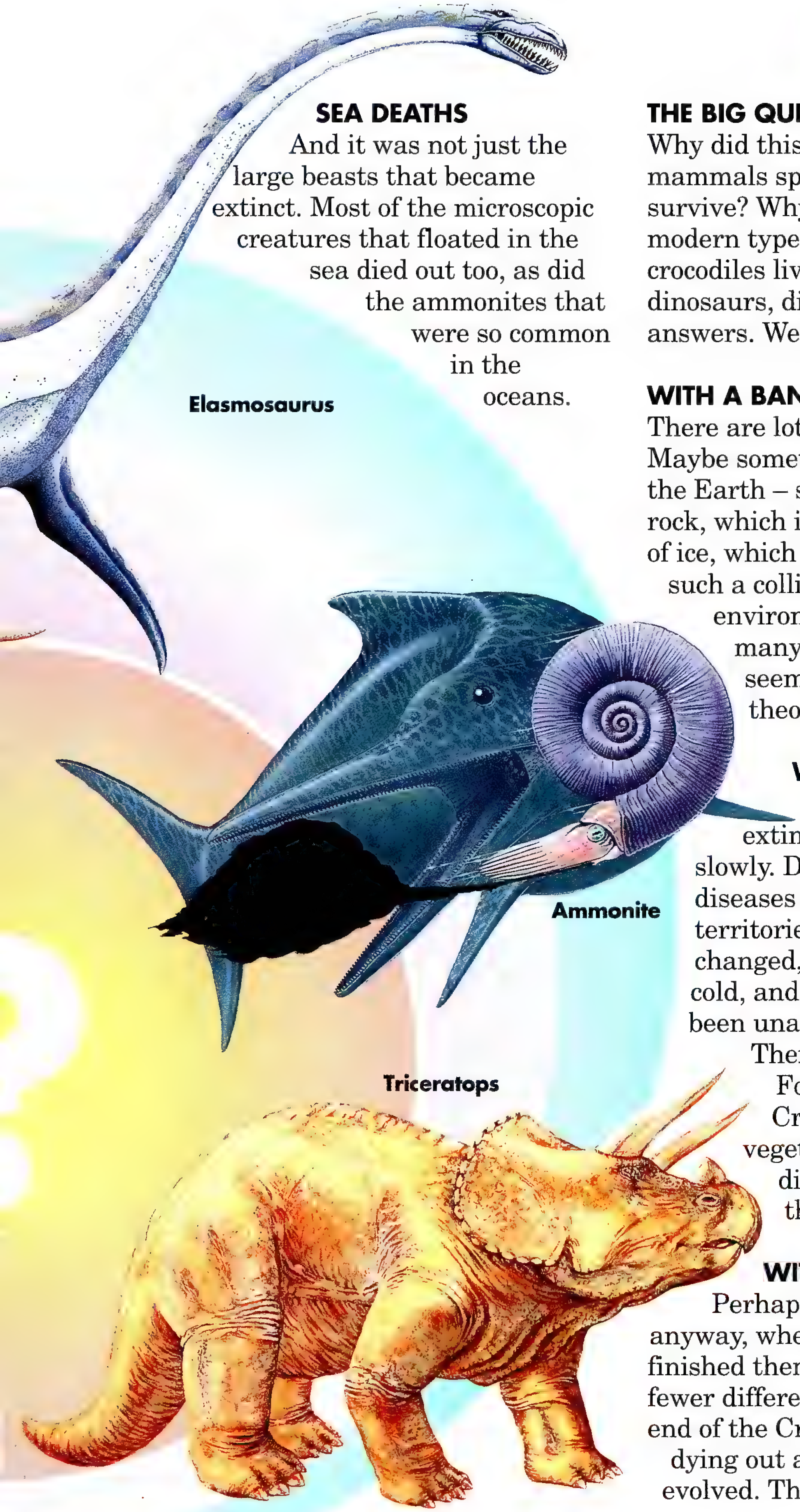
ALL GO TOGETHER

So let us take a close look at what happened 66 million years ago at the end of the Cretaceous Period. It was not only the dinosaurs that became extinct. Many other animals did as well. The pterosaurs died out, as did the great sea reptiles such as the plesiosaurs and the mosasaurs.



SEA DEATHS

And it was not just the large beasts that became extinct. Most of the microscopic creatures that floated in the sea died out too, as did the ammonites that were so common in the oceans.



THE BIG QUESTIONS

Why did this happen? And why were the mammals spared? Why did the birds survive? Why was there no effect on the modern types of fishes? Why did the crocodiles live on while their relatives, the dinosaurs, did not? There are no simple answers. We just don't know for sure.

WITH A BANG

There are lots of possible explanations. Maybe something from space crashed into the Earth – something like a mountain of rock, which is called a meteorite, or a mass of ice, which is called a comet. The damage such a collision would have done to the environment could have killed off many types of animals. There seems to be some evidence for this theory in the Cretaceous rocks.

WITH A WHIMPER

On the other hand, these extinctions may have happened slowly. Dinosaurs could have spread diseases as they migrated to new territories. Temperatures may have changed, becoming very hot or very cold, and the big animals may have been unable to adapt quickly enough. There is evidence for this too. Fossils of plants from Cretaceous times show that the vegetation, and hence the climate, did change towards the end of the Cretaceous Period.

WITH A WHIMPER-BANG?

Perhaps the dinosaurs were dying off anyway, when along came a meteorite and finished them off! Certainly there were fewer different dinosaur types towards the end of the Cretaceous Period, with species dying out at a greater rate than new ones evolved. The truth is, we just do not know.

FIRST WIPE-OUT

More than half of the world's animals died out at the end of the Ordovician Period, about 440 million years ago. It was the first major mass extinction.

ALL CHANGE AT SEA

In the seas, the trilobites were almost wiped out. They survived, but there were nowhere near as many as there had been before. Just after this period of extinction, the fishes began to evolve to rule the seas.

REEF WRECK

The next mass extinction occurred during the Devonian Period, about 370 million years ago. Many creatures, including some reef-building corals, died out. With few reef-builders, reefs vanished from the shallow seas. Some scientists think that this was due to water, with less oxygen in, sweeping from the deep oceans into the shallow seas. The amphibians, with their ability to breathe outside the water, began to evolve shortly afterwards.

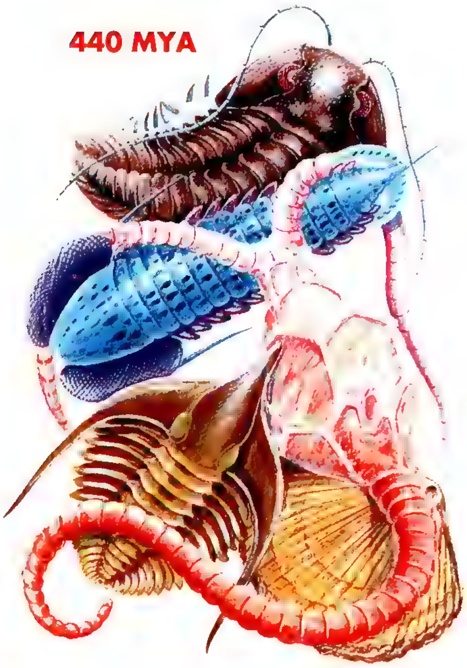
AN ALMOST EMPTY SEA

The biggest mass extinction of them all came at the end of the Permian Period, about 245 million years ago. A staggering 96 per cent of species of sea-living animals died out at this time. This probably occurred because all the continents moved together forming the single supercontinent of Pangaea. As a result, many of the shallow seas were squeezed out from between the merging continents.

TRIASSIC CHANGE

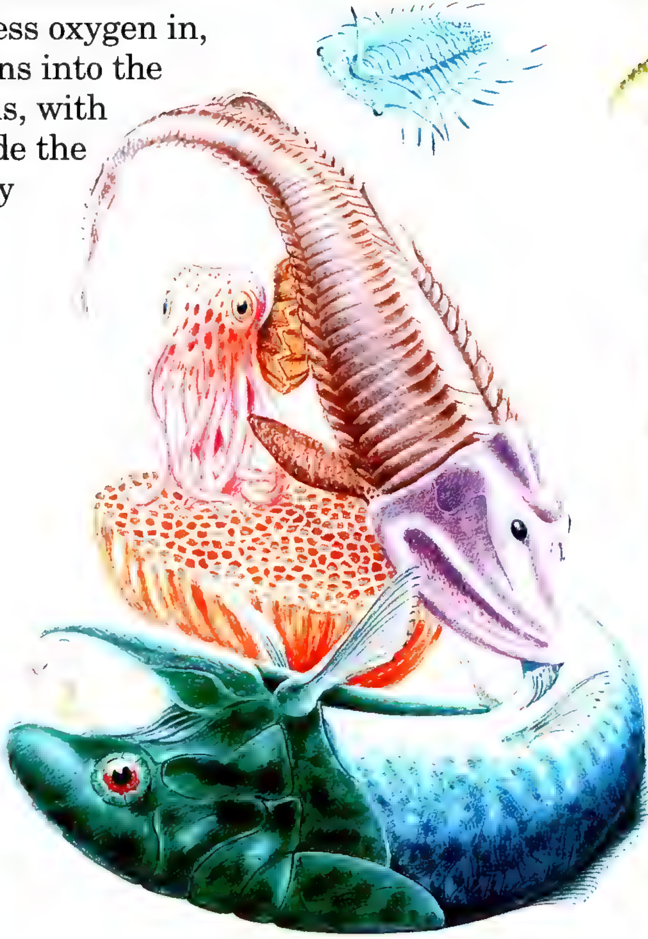
Then, about 210 million years ago, came the mass extinction that brought the Triassic Period to a halt.

440 MYA



Late Ordovician – 50% of species, including some brachiopods, die out.

370 MYA



Late Devonian – 50% of species, including some fish, corals and trilobites, die out.

245 MYA

Late Permian
living things

WELCOME, DINOSAURS

Again the sea animals living during the Triassic Period were hit particularly badly, about half of them disappearing for ever. At about this time the dinosaurs really became the masters of the Earth.

BYE BYE, DINOSAURS

The final extinction, at the end of the Cretaceous Period, is the one we know most about. But still we do not know for sure the cause of it.

HISTORY REPEATS ITSELF?

And what of today? Are we living through another mass extinction? Recently we have lost dodos, moas, passenger pigeons, steller's sea cows, marsupial wolves (maybe), and all sorts of other creatures.

Is it true

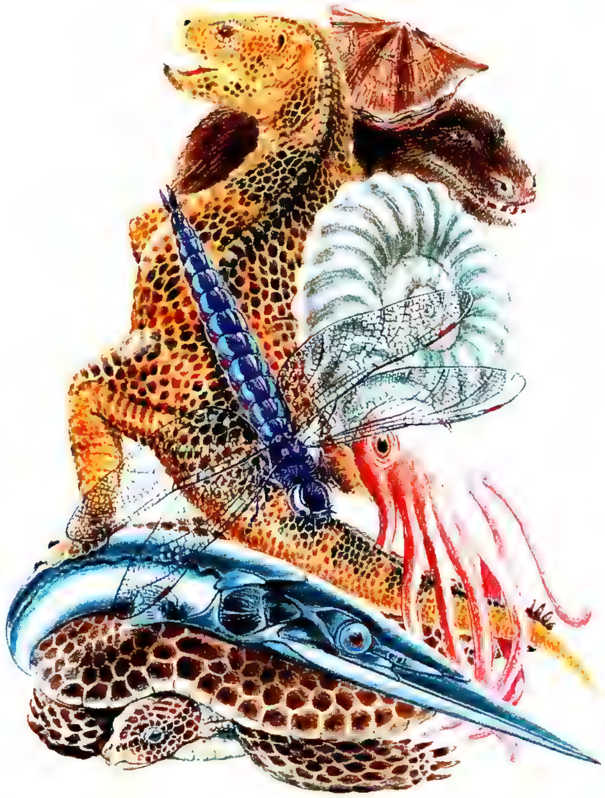
that many amphibians and reptiles died out at the end of the Permian Period?

Yes. About 75 per cent of all the amphibian and reptile families on Earth died out in the biggest mass extinction of life on Earth – so far.

NEW WHALES?

In the far future the fossils in the rocks formed at this time will mark the end of these creatures, and so count as a mass extinction. And if more creatures, such as the whales, die out? It will be very sad for us, and our children, and their children. But, as we have seen, something else will eventually, after millions of years, evolve to take their place. What kind of beast will it be?

– over 95% of all die out.



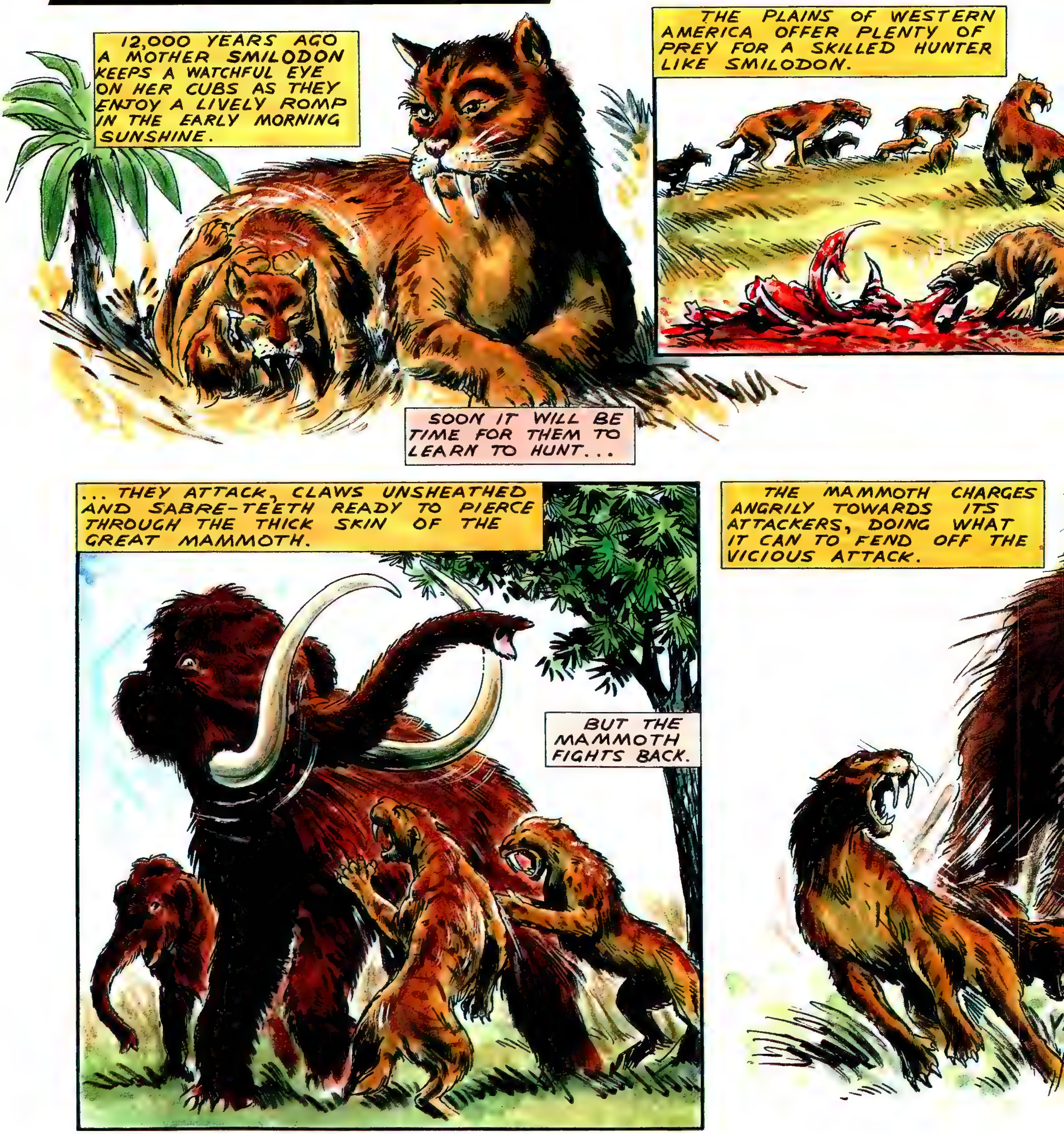
210 MYA

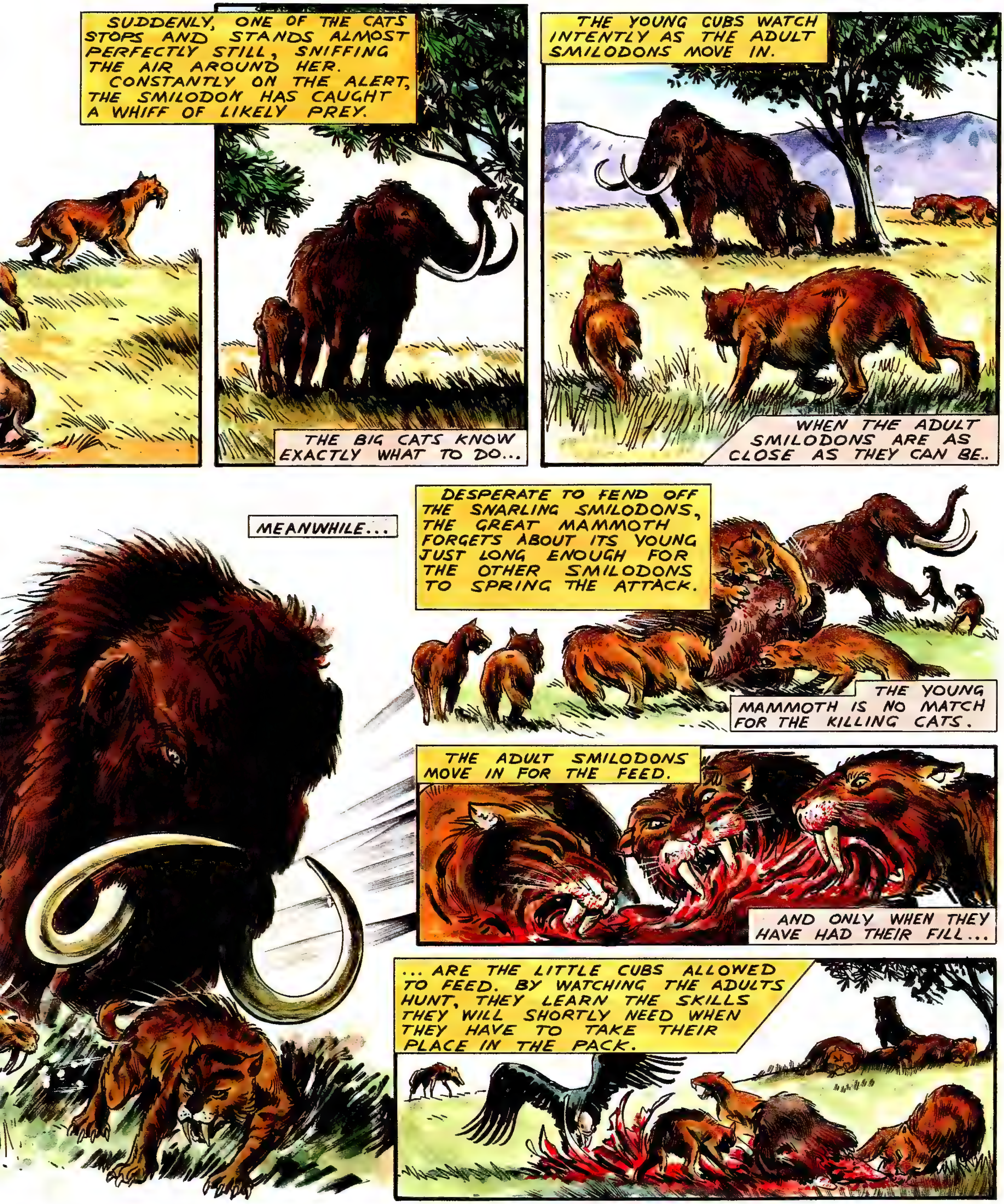
End of the Triassic – many animals, including most of the land vertebrates, die out.

66 MYA

End of the Cretaceous – 50% of species die out, including the dinosaurs.

A DAY IN THE LIFE OF SMILODON

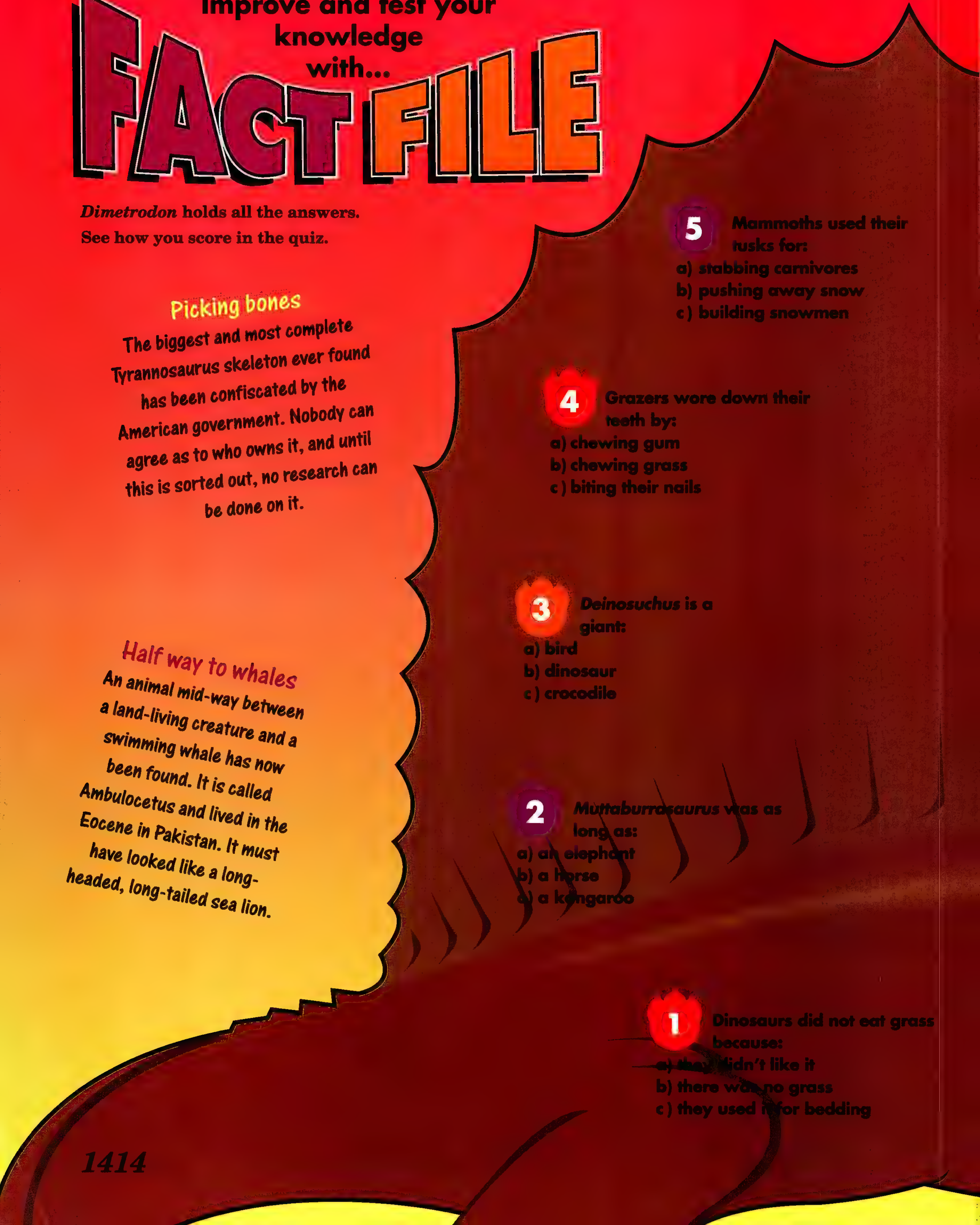

12,000 YEARS AGO A MOTHER SMILODON KEEPS A WATCHFUL EYE ON HER CUBS AS THEY ENJOY A LIVELY ROMP IN THE EARLY MORNING SUNSHINE.
THE PLAINS OF WESTERN AMERICA OFFER PLENTY OF PREY FOR A SKILLED HUNTER LIKE SMILODON.
SOON IT WILL BE TIME FOR THEM TO LEARN TO HUNT...
... THEY ATTACK, CLAWS UNSHEATHED AND SABRE-TEETH READY TO PIERCE THROUGH THE THICK SKIN OF THE GREAT MAMMOTH.
BUT THE MAMMOTH FIGHTS BACK.
THE MAMMOTH CHARGES ANGRILY TOWARDS ITS ATTACKERS, DOING WHAT IT CAN TO FEND OFF THE VICIOUS ATTACK.


SUDDENLY, ONE OF THE CATS STOPS AND STANDS ALMOST PERFECTLY STILL, SNIFFING THE AIR AROUND HER.
CONSTANTLY ON THE ALERT, THE SMILODON HAS CAUGHT A WHIFF OF LIKELY PREY.
THE BIG CATS KNOW EXACTLY WHAT TO DO...
THE YOUNG CUBS WATCH INTENTLY AS THE ADULT SMILODONS MOVE IN.
WHEN THE ADULT SMILODONS ARE AS CLOSE AS THEY CAN BE..
MEANWHILE...
DESPERATE TO FEND OFF THE SNARLING SMILODONS, THE GREAT MAMMOTH FORGETS ABOUT ITS YOUNG JUST LONG ENOUGH FOR THE OTHER SMILODONS TO SPRING THE ATTACK.
THE YOUNG MAMMOTH IS NO MATCH FOR THE KILLING CATS.
THE ADULT SMILODONS MOVE IN FOR THE FEED.
AND ONLY WHEN THEY HAVE HAD THEIR FILL...
... ARE THE LITTLE CUBS ALLOWED TO FEED. BY WATCHING THE ADULTS HUNT, THEY LEARN THE SKILLS THEY WILL SHORTLY NEED WHEN THEY HAVE TO TAKE THEIR PLACE IN THE PACK.

Improve and test your knowledge with...

FACT FILE

Dimetrodon holds all the answers. See how you score in the quiz.



Picking bones

The biggest and most complete Tyrannosaurus skeleton ever found has been confiscated by the American government. Nobody can agree as to who owns it, and until this is sorted out, no research can be done on it.

Half way to whales

An animal mid-way between a land-living creature and a swimming whale has now been found. It is called Ambulocetus and lived in the Eocene in Pakistan. It must have looked like a long-headed, long-tailed sea lion.

5 **Mammoths used their tusks for:**

a) stabbing carnivores
b) pushing away snow
c) building snowmen

4 **Grazers wore down their teeth by:**

a) chewing gum
b) chewing grass
c) biting their nails

3 ***Deinosuchus* is a giant:**

a) bird
b) dinosaur
c) crocodile

2 ***Muttaburrasaurus* was as long as:**

a) an elephant
b) a horse
c) a kangaroo

1 **Dinosaurs did not eat grass because:**

a) they didn't like it
b) there was no grass
c) they used it for bedding

Over-fed and over here

We think of the extinct dodo as a very fat bird. This is because all the dodos brought to Europe from Mauritius were over-fed during the journey and became fat. A dodo was quite slim, and would have weighed 12 to 14 kg – about half the size usually shown.

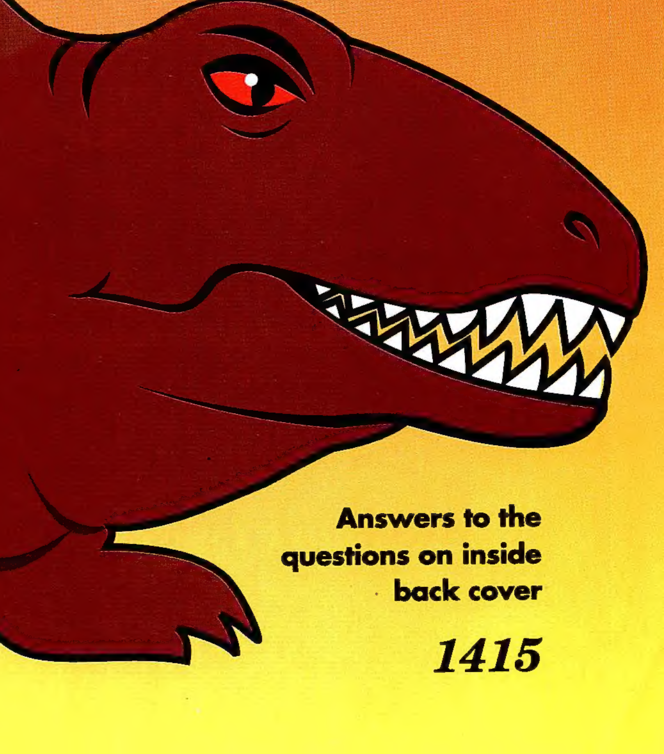
6 *Pelorovis* was a grass-eater with:
- a) huge, down-curved horns
- b) large fangs
- c) enormous feet

7 What does dicynodont mean?
- a) two scaly feet
- b) two large lumps
- c) two dog-like teeth

8 *Eoraptor*'s name means:
- a) oldest dinosaur
- b) dawn stealer
- c) egg stealer

9 *Saltopus* was possibly able to:
- a) jump
- b) ski
- c) glide

10 The most complete skeleton found in Britain is of a:
- a) megalosaur
- b) brachiosaurid
- c) sauropod



Answers to the questions on inside back cover

A to Z OF PREHISTORIC ANIMALS DE – DI

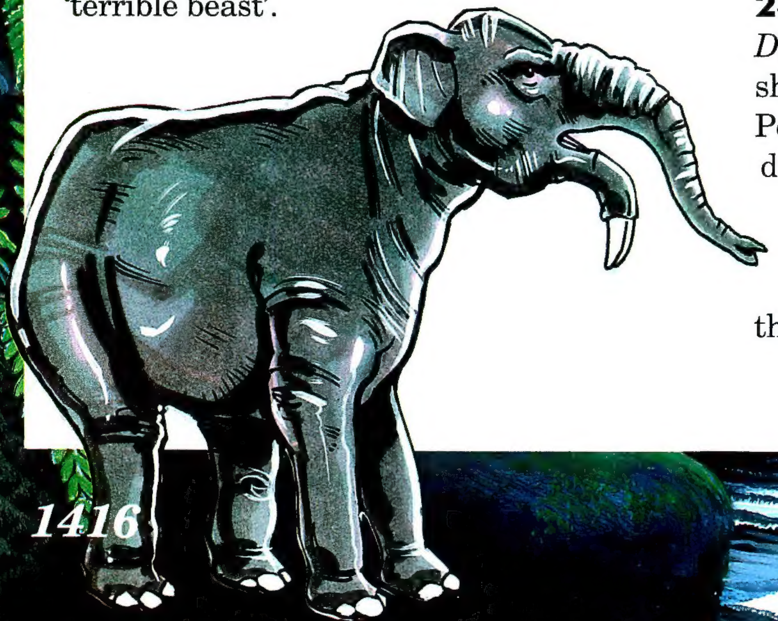
D

DEINOSUCHUS
75 MYA

The biggest of all the crocodiles, *Deinosuchus* (dine-oh-suke-us) lurked in the freshwater rivers of Texas, USA, in the Late Cretaceous Period. This 'terrible crocodile' lay like a huge tree trunk in the water, ready to snap at victims with its gigantic jaws. It was big enough to ambush unwary dinosaurs. *Deinosuchus* grew to be as long as a lorry and its skull alone was as big as a small car.

DEINOTHERIUM 15 MYA

Elephant-like *Deinotherium* (dine-oh-thee-ree-um) was tall enough to look over the top of a double-decker bus. It lived in Africa, Europe and Asia during the Pliocene. *Deinotherium* had a long trunk and strange downward-curving tusks on its lower jaw. These may have been used to scrape the bark from trees or as a sort of hoe to hack roots from the ground. Its name means 'terrible beast'.

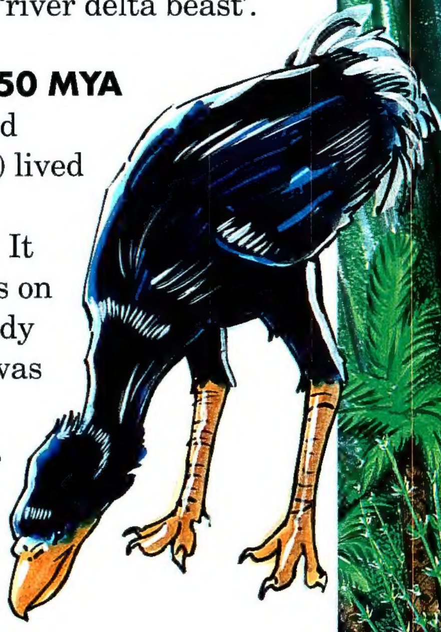


DELTATHERIDIUM
65 MYA

Deltatheridium (del-tah-thee-ri-dee-um) was a tiny flesh-eating animal from Mongolia. About half the size of a modern squirrel, *Deltatheridium* probably ate insects which it caught at twilight. It had a long, pointed snout, and clawed hands and feet. *Deltatheridium* means 'river delta beast'.

DIATRYMA 50 MYA

The huge, flightless bird *Diatryma* (dy-a-try-ma) lived in Europe and North America in the Eocene. It hunted small mammals on its two strong and speedy legs. *Diatryma*'s head was huge for the size of its body and it had a hard, curved beak which it used to crush its prey.



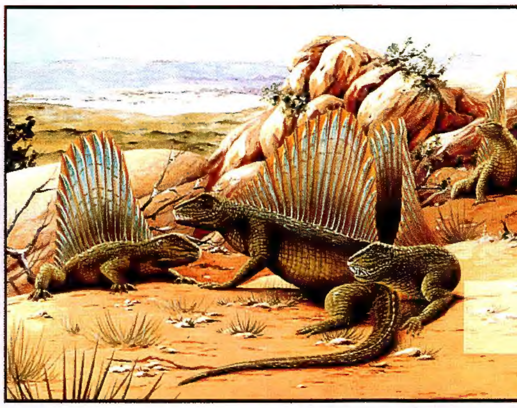
DICYNODON
230 MYA

Dicynodon (dy-sy-no-don) was a small pig-shaped animal. It lived in South Africa in Permian and Triassic times. It was a dicynodont (mammal-like reptile), with 'two dog-like teeth'. *Dicynodon* only had two tusks in its upper jaw and cut up plants with strong, horn-covered jaws. It chewed the food with its powerful jaw muscles.

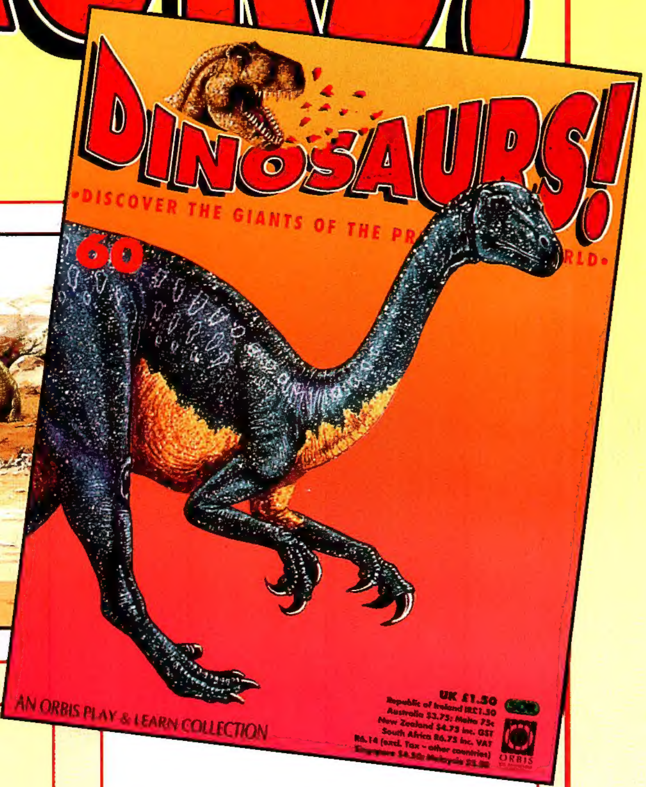
MYA = MILLION YEARS AGO

COMING IN PART 60 OF

DINOSAURS!



Find out what stabbed the skull of a prehistoric cat in TIME DETECTIVE. Discover the scary world of skeletons in SPOTTER'S GUIDE.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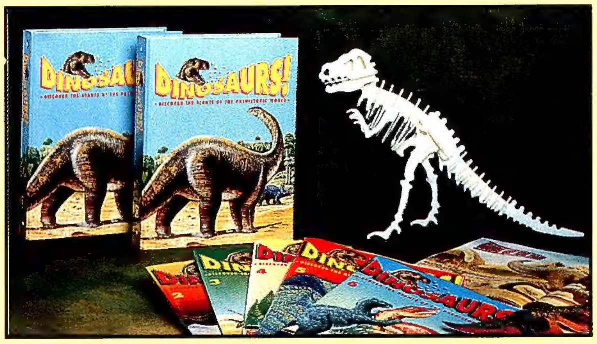

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ANSWERS TO FACT FILE QUESTIONS: 1.b 2.a 3.c 4.b 5.b 6.a 7.c 8.b 9.a 10.b

Dr David Norman of Cambridge University answers your dinosaur questions

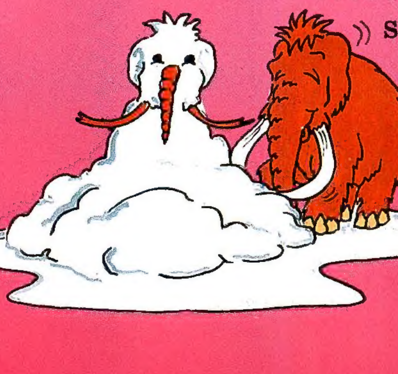
ASK THE EXPERT

Can we tell what kind of dinosaurs made a particular footprint?

In general terms, it is possible to tell the difference between the footprints of different dinosaurs. For example, sauropod prints are very large and rounded; ornithopods have quite broad, three-toed prints; theropods have three-toed prints too, but their toes tend to be long and sharply pointed. However, it is not possible to be precise about dinosaur footprints. We cannot yet analyse footprints, like the mythical detective Sherlock Holmes, and say who made them.

What did a mammoth use its big tusks for?

A mammoth's tusks were huge and bow-ended and were almost certainly used as snow ploughs to push away the snow so it could feed on the vegetation below. Its tusks would also have been good weapons for fending off large carnivores (but would have only been useful for pushing animals aside rather than for stabbing). They might also have played a role in attracting a partner during the mating season.

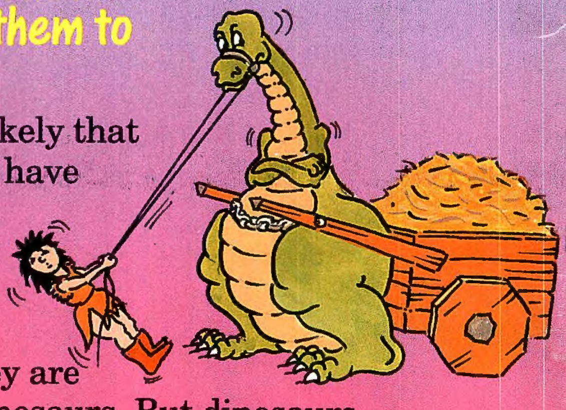


Why is palaeontologist sometimes spelt paleontologist?

The difference in spelling is just a national preference. Palaeontologist comes from palaeontology which was invented in the 1830s in Britain and follows classical spelling. This word has been 'Americanised' and is spelled paleontology by removing the 'a' after the first 'l'. As an Englishman, I prefer the traditional spelling of palaeontology.

If humans had lived with the dinosaurs, could we have trained them to work for us?

I think it is unlikely that dinosaurs could have been trained by humans. It is true that some birds can be trained, and they are closest to the dinosaurs. But dinosaurs were mostly too big and too dangerous. Some more intelligent, non-predatory dinosaurs could well have been trained. But who knows?



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